



Complete Summary

TITLE

Postoperative physiologic and metabolic derangement: rate per 1,000 elective surgical discharges.

SOURCE(S)

AHRQ quality indicators. Guide to patient safety indicators [revision 1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003 May 28. 143 p. (AHRQ Pub; no. 03-R203).

Brief Abstract

DESCRIPTION

This measure assesses the number of cases of specified physiological or metabolic derangement per 1,000 elective surgical discharges.

RATIONALE

Patient safety is an issue of major national interest. Policymakers, providers, and consumers have made the safety of care in United States hospitals a top priority. The need to assess, monitor, track, and improve the safety of inpatient care became apparent with publication of the Institute of Medicine's series of reports describing the problem of medical errors. As our health care system becomes more complex, the possibility of significant unintended adverse effects increases.

Patient Safety Indicators (PSIs), which are based on computerized hospital discharge abstracts from the AHRQ's Healthcare Cost and Utilization Project (HCUP), can be used to better prioritize and evaluate local and national initiatives. Analyses of these and similar inexpensive, readily available administrative data sets may provide a screen for potential medical errors and a method for monitoring trends over time.

This indicator is intended to flag cases of postoperative metabolic or physiologic complications. The population at risk is limited to elective surgical patients, because patients undergoing non-elective surgery may develop less preventable derangements. In addition, each diagnosis has specific exclusions, designed to reduce the number of flagged cases in which the diagnosis was present on admission or was more likely to be non-preventable.

PRIMARY CLINICAL COMPONENT

Postoperative physiologic/metabolic complications

DENOMINATOR DESCRIPTION

All elective surgical discharges defined by admission type and specific Diagnosis-Related Groups (DRGs).

Exclude patients with both a diagnosis code of ketoacidosis, hyperosmolarity, or other coma (subgroups of physiologic and metabolic derangements coding) and a principal diagnosis of diabetes.

Exclude patients with both a secondary diagnosis code for acute renal failure (subgroup of physiologic and metabolic derangements coding) and a principal diagnosis of acute myocardial infarction, cardiac arrhythmia, cardiac arrest, shock, hemorrhage, or gastrointestinal hemorrhage.

Exclude obstetrical patients in Major Diagnostic Category 14 (MDC 14).

NUMERATOR DESCRIPTION

Discharges with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes for physiologic and metabolic derangements in any secondary diagnosis field per 1,000 elective surgical discharges.

Discharges with acute renal failure (subgroup of physiologic and metabolic derangements) must be accompanied by a procedure code for dialysis (3995, 5498).

Evidence Supporting the Measure

PRIMARY MEASURE DOMAIN

Outcome

SECONDARY MEASURE DOMAIN

Not applicable

EVIDENCE SUPPORTING THE MEASURE

A formal consensus procedure involving experts in relevant clinical, methodological, and organizational sciences
One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Evidence Supporting Need for the Measure

NEED FOR THE MEASURE

Unspecified

State of Use of the Measure

STATE OF USE

Current routine use

CURRENT USE

Internal quality improvement
National health care quality reporting
Quality of care research

Application of Measure in its Current Use

CARE SETTING

Hospitals

PROFESSIONALS RESPONSIBLE FOR HEALTH CARE

Physicians

LOWEST LEVEL OF HEALTH CARE DELIVERY ADDRESSED

Single Health Care Delivery Organizations

TARGET POPULATION AGE

Unspecified

TARGET POPULATION GENDER

Either male or female

STRATIFICATION BY VULNERABLE POPULATIONS

Unspecified

Characteristics of the Primary Clinical Component

INCIDENCE/PREVALENCE

Based on the 1997 Healthcare Cost and Utilization Project (HCUP) State Inpatient Database for 19 States, the Postoperative Physiologic and Metabolic Derangement rate was 0.83 per 1,000 population at risk.

EVIDENCE FOR INCIDENCE/PREVALENCE

AHRQ quality indicators. Guide to patient safety indicators [revision 1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003 May 28. 143 p. (AHRQ Pub; no. 03-R203).

ASSOCIATION WITH VULNERABLE POPULATIONS

Unspecified

BURDEN OF ILLNESS

Based on the matching analysis of the 2000 Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS) data reported by Zhan and Miller, postoperative physiologic and metabolic derangement was associated with an excess length of stay of 8.89 days, excess charges of \$54,818, and an excess mortality rate of 19.81%.

EVIDENCE FOR BURDEN OF ILLNESS

Zhan C, Miller MR. Excess length of stay, charges, and mortality attributable to medical injuries during hospitalization. JAMA 2003 Oct 8;290(14):1868-74.

[PubMed](#)

UTILIZATION

See "Burden of Illness" field.

COSTS

See "Burden of Illness" field.

Institute of Medicine National Healthcare Quality Report Categories

IOM CARE NEED

Getting Better

IOM DOMAIN

Safety

Data Collection for the Measure

CASE FINDING

Users of care only

DESCRIPTION OF CASE FINDING

All elective surgical discharges defined by admission type and specific Diagnosis-Related Groups (DRGs).

DENOMINATOR (INDEX) EVENT

Clinical Condition
Institutionalization
Therapeutic Intervention

DENOMINATOR INCLUSIONS/EXCLUSIONS

Inclusions

All elective surgical discharges defined by admission type and specific Diagnosis-Related Groups (DRGs). Refer to Appendix A of the original measure documentation for DRGs.

Exclusions

Exclude patients with both a diagnosis code of ketoacidosis, hyperosmolarity, or other coma (subgroups of physiologic and metabolic derangements coding) and a principal diagnosis of diabetes.

Exclude patients with both a secondary diagnosis code for acute renal failure (subgroup of physiologic and metabolic derangements coding) and a principal diagnosis of acute myocardial infarction, cardiac arrhythmia, cardiac arrest, shock, hemorrhage, or gastrointestinal hemorrhage.

Exclude obstetrical patients in Major Diagnostic Category 14 (MDC 14) (Pregnancy, Childbirth and the Puerperium).

Refer to Appendix A of the original measure documentation for International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes and DRGs.

NUMERATOR INCLUSIONS/EXCLUSIONS

Inclusions

Discharges with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes for physiologic and metabolic derangements in any secondary diagnosis field per 1,000 elective surgical discharges.

Discharges with acute renal failure (subgroup of physiologic and metabolic derangements) must be accompanied by a procedure code for dialysis (3995, 5498).

Refer to Appendix A of the original measure documentation for ICD-9-CM codes.

Exclusions
Unspecified

DENOMINATOR TIME WINDOW

Time window is a single point in time

NUMERATOR TIME WINDOW

Institutionalization

DATA SOURCE

Administrative data

LEVEL OF DETERMINATION OF QUALITY

Individual Case

OUTCOME TYPE

Adverse Outcome

PRE-EXISTING INSTRUMENT USED

Unspecified

Computation of the Measure

SCORING

Rate

INTERPRETATION OF SCORE

Better quality is associated with a lower score

ALLOWANCE FOR PATIENT FACTORS

Analysis by high-risk subgroup (stratification on vulnerable populations)

Analysis by subgroup (stratification on patient factors)

Risk adjustment method widely or commercially available

DESCRIPTION OF ALLOWANCE FOR PATIENT FACTORS

Risk adjustment of the data is recommended using age, sex, Diagnosis-Related Group (DRG), and comorbidity categories.

Application of multivariate signal extraction (MSX) to smooth risk adjusted rates is also recommended.

STANDARD OF COMPARISON

External comparison at a point in time
External comparison of time trends
Internal time comparison

Evaluation of Measure Properties

EXTENT OF MEASURE TESTING

The Patient Safety Indicators (PSIs) were evaluated by the project team using empirical analyses to explore the frequency and variation of the indicators, the potential bias, based on limited risk adjustment, and the relationship between indicators. The data sources used in the empirical analyses were the 1997 Florida State Inpatient Database (SID) for initial testing and development and the 1997 Healthcare Cost and Utilization Project (HCUP) State Inpatient Database for 19 States for the final empirical analyses.

All potential indicators were examined empirically by developing and conducting statistical tests for precision, bias, and relatedness of indicators. Three different estimates of hospital performance were calculated for each indicator:

1. The raw indicator rate was calculated using the number of adverse events in the numerator divided by the number of discharges in the population at risk by hospital.
2. The raw indicator was adjusted to account for differences among hospitals in age, gender, modified Diagnosis-Related Group (DRG), and comorbidities.
3. Multivariate signal extraction methods were applied to adjust for reliability by estimating the amount of "noise" (i.e., variation due to random error) relative to the amount of signal (i.e., systematic variation in hospital performance or reliability) for each indicator.

Refer to the original measure documentation for additional details.

EVIDENCE FOR RELIABILITY/VALIDITY TESTING

AHRQ quality indicators. Guide to patient safety indicators [revision 1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003 May 28. 143 p. (AHRQ Pub; no. 03-R203).

Identifying Information

ORIGINAL TITLE

Postoperative physiologic and metabolic derangement.

MEASURE COLLECTION

[Agency for Healthcare Research and Quality \(AHRQ\) Quality Indicators](#)

MEASURE SET NAME

[Agency for Healthcare Research and Quality \(AHRQ\) Patient Safety Indicators](#)

DEVELOPER

Agency for Healthcare Research and Quality

INCLUDED IN

National Healthcare Disparities Report (NHDR)
National Healthcare Quality Report (NHQR)

ADAPTATION

This indicator was originally proposed by Iezzoni and colleagues (1994) as part of the Complications Screening Program (CSP) (CSP 20, "postoperative physiologic and metabolic derangements"). The University HealthSystem Consortium adopted the CSP indicator for major surgery patients (#2945).

RELEASE DATE

2003 Mar

REVISION DATE

2003 May

MEASURE STATUS

This is the current release of this measure.

SOURCE(S)

AHRQ quality indicators. Guide to patient safety indicators [revision 1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003 May 28. 143 p. (AHRQ Pub; no. 03-R203).

MEASURE AVAILABILITY

The individual measure, "Postoperative Physiologic and Metabolic Derangement," is published in "AHRQ Quality Indicators. Guide to Patient Safety Indicators." This document is available in [Portable Document Format \(PDF\)](#) and a [zipped WordPerfect\(R\) file](#) from the [Quality Indicators](#) page at the Agency for Healthcare Research and Quality (AHRQ) Web site.

For more information, please contact the QI Support Team at support@qualityindicators.ahrq.gov.

COMPANION DOCUMENTS

The following are available:

- "AHRQ Patient Safety Quality Indicators Software (Version 2.1)" (Rockville, [MD]: AHRQ, 2003 Mar 13) and its accompanying documentation can be downloaded from the [Agency for Healthcare Research and Quality \(AHRQ\) Web site](#). (The software is available in both SAS- and SPSS-compatible formats.)
- Guidance for using the AHRQ quality indicators for hospital-level public reporting or payment. Rockville (MD): Agency for Healthcare Research and Quality; 2004 Aug. 24 p. This document is available from the [AHRQ Web site](#).
- "HCUPnet, Healthcare Cost and Utilization Project" [internet]. (Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 [Various pagings]). HCUPnet is available from the [AHRQ Web site](#).
- "Refinement of the HCUP Quality Indicators" (Rockville [MD]: AHRQ, 2001 May. Various pagings. [Technical review; no. 4]; AHRQ Publication No. 01-0035). This document was prepared by the UCSF-Stanford Evidence-based Practice Center for AHRQ and can be downloaded from the [AHRQ Web site](#).

NQMC STATUS

This NQMC summary was completed by ECRI on October 1, 2003. The information was verified by the measure developer on October 29, 2003.

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